

## Reject student leaves course

by David Walker

An employee of the London Borough of Newham, who is a head of department at North-East London Polytechnic, has been ordered to leave a course, has been withdrawn from the polytechnic by the local authority.

Dr George Brown, the polytechnic's director, had formally instructed Mr Eric Baker, head of the department of social work, health and nursing, to admit a student who had previously given through the selection procedures for the course and been rejected. Dr Brown warned that "favourable relationships" with the local authority would otherwise be jeopardized.

However, after a meeting this week between officials of the Newham education department, Dr Brown and Mr Tom Jones, senior liaison officer of the Association of Teachers in Technical Institutions, it was agreed that "because the term was so far advanced" the employee would be withdrawn.

The decision has been greeted with relief by the staff of the social department who had complained to the national validating body for the course, the Central Council for Education and Training in Social Work. They had notified Mr Baker that they could not teach a student forced on them.

A meeting of the governors of NLEP next week will consider a special report on the appointment of the polytechnic's deans of studies. It is understood the report will call for the academic board to be better consulted on such appointments.

## Oxford plans postal vote on external degree

Oxford University's Congregation has rejected by 62 votes to 54 a proposal to establish a four-year external degree for student teachers at Cullham and Westminster Colleges of Education.

However, at the two-hour debate, the vice-chancellor, Mr John Hobokuk, announced that because the general board of the faculties' proposal to establish the degree was opposed by the Congregation a postal vote would be held of all members of congregation.

The debate was marked by an attack on the degree by Dr Harry Judge, director of the department of educational studies, who said that if the proposal was accepted the university would enter a new phase of expanding and unpredictable commitments.

The final intake from Cullham and Westminster for the new degree would be large—about 140—and Oxford should not create a cumbersome external degree of this size, he said.

"Education as it is now understood and taught is a dubious subject. Its definition as a component in this particular degree is wholly unsatisfactory."

"We cannot have a degree, even on external one, for perhaps 200 candidates a year, and not have a firming and orthodox faculty. If Congregation manufactures a new hours school it must next create a framework to support it, but a framework could do no more than support a scholarly effort to develop a new school in education."

To extend the validating relationship between the university and the colleges of education would be bad for the university, for the teaching profession, for the ordered development of higher education and, worst of all, for the colleges of education, he said.

The principal of Westminster College, Mr D. W. Cronin, said it seemed that the Government eventually expected there would be only two ways of entering the teaching profession: either by a five-year postgraduate course, or by the bachelor of education degree.

The most certain method of ensuring that the teaching profession would never again have to grapple with the problem of first and second-class citizens was in universities, such as Oxford with a long tradition of liberal inquiry behind them, to retain their interest both in the postgraduate course and the bachelor of education degree.

The master of University College, Lord Redcliffe-Maud, said that the university having agreed some years ago to have an external bachelor of education pass degree should not refuse to upgrade it to honours.

But the provost of the Queen's College, Lord Blake, said that if Oxford went in for external degree then the whole matter needed a wider consideration in principle. It should not be brought in by an indirect way which would constitute a precedent.

Professor J. H. Burnett, vice-chancellor of the general board of studies, said his proposal to establish the degree had the support of all but three faculties.

## Mott switches universities

Leicester University senate this week accepted responsibility for the validation of courses at C. F. Mott College of Education, Prescott, near Liverpool.

The college, which in the past has been validated by Liverpool University, wishes to transfer in order to introduce a greater range of courses. Liverpool does not offer a BA honours degree or a post-graduate honours degree to its college.

It was also felt that Leicester would be more sympathetic to the introduction of postgraduate courses. Its method of considering the academic programme of each of its colleges separately was also preferred to Liverpool's method of considering them together.

Leicester University's board of studies for associated colleges decided on October 11 to recommend to senate that the university accept responsibility for validating the college's courses from September, 1976.

## Societies' plight

from page 1

Professor Peter Mathias of All Souls College, Oxford, treasurer of the Economic History Society, who recently looked at the state of learned societies in the social sciences under the auspices of the Social Science Research Council, Professor Mathias has recently devoted much attention to the threat to publishing facilities, said in his proposal to establish the degree had the support of all but three faculties.

## CDP starts magazine

A new magazine, *Focus on Polytechnics*, has been launched by the Committee of Directors of Polytechnics. It aims to highlight the character and range of polytechnic education in England and Wales.

About 30,000 copies will be sent out each term to schools, colleges and careers offices. The CDP is hoping the magazine's style and content will appeal in particular to school and college leavers.

The magazine has been produced as a result of a review of polytechnic communications by the CDP, led by Sir Alex Smith, its chairman.

## CBI on universities

from page 1

"Provided that cuts in expenditure and manpower are made in a controlled and coordinated manner, the CBI considers that they should not damage the universities' capability to perform their functions," it concluded.

## NEXT WEEK

Replies to Paul Johnson from John Griffith, A. H. Halsey and Keith Hampson.

Mory Ellison on American slavery.

Five pages of engineering books. Profile of Malcolm Bradbury.

Printed and Published by Times Newspapers Ltd, 1, Abchurch Lane, London EC4N 3DF. Tel: 01-533 3000. A weekly supplement to The Times. Price 12p. (Incl. postage paid at New York, N.Y.)

## 1 in 7 degree courses recruit below 20 students

## 'Unpalatable' facts about poly courses in secret report

by David Hencke

About 100 of the 700 degree courses validated by the Council for National Academic Awards of colleges and polytechnics in England and Wales recruited fewer than 20 students in October, 1974, according to confidential figures supplied to the Department of Education and Science.

Seven degree courses were refused permission to start by regional staff inspectors because they failed to attract more than a dozen suitable applicants. At North Staffordshire Polytechnic, a mathematics degree attracted only three applicants.

Another five degree courses were closed down, mainly because of falling recruitment. Among them was a German degree at the Polytechnic of North London which had only three students originally recruited to its external London University degree.

Nevertheless, the number of first-year students registered for CNA courses rose from 10,784 to 13,810 for full-time courses and from 6,042 to 6,538 for sandwich courses between 1973 and 1974.

Science and technology courses suffered the greatest difficulties in recruiting, although some language, economics and social science degrees also attracted small numbers.

The seven degrees which did not start were chemistry at Thames Polytechnic; mathematics at North Staffordshire, Newcastle and Liverpool; metallurgy and materials science at City of London; and materials science and nautical studies at Sunderland. The City of London degree was in competition with a modular course in science and humanities at the BSE in mathematics, statistics and computing at Liverpool received less approval.

The five degrees which were closed down included mathematics, chemistry and physics at Lanchester; physical sciences at Plymouth; German and French at the Lanchester; and the Plymouth degree were replaced by new modular degrees.



'Quick!—out the back way! It's the poly press gang!'

In 1973 the Lanchester degree attracted 14, 28 and 10 students respectively, while there were only 11 students on the physical sciences course of Plymouth.

Polytechnics with the largest numbers of degree courses whose recruitment was below 20 included Portsmouth (10), Thames (8), North Staffs (7), South Bank (6), Sunderland (5), Huddersfield, Glamorgan and Liverpool (4 each). Polytechnics with courses which attracted the largest admissions included Portsmouth, Central London and Middlesex.

Figures for 1975 are not yet available for the whole of Britain but four of the seven degrees which failed to start last year have been able to recruit this September. These include chemistry at

Thames (about 15 students recruited); nautical studies at Sunderland (16); and mathematics at Newcastle (14) and Liverpool (about 20).

The materials science and mathematics degrees of both Sunderland and North Staffs failed to recruit for the second year running and the metallurgy and materials science degree at City of London has been closed.

However, four other degrees already in existence have failed to run this year because of further reductions in student numbers: two nautical studies degrees at City of London, which attracted two and five students each last year, a physics degree at South Bank (eight students); and a materials science degree at Liverpool (one student).

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## SRC prepares £10m inflation cuts

by Alan Cane and David Dickson

The Science Research Council plans to cut up to £10m from its expenditure next year if the Government fails to hold inflation to 10 per cent or less. It would mean the loss of up to 20 per cent of the money available for grants, awards and capital expenditure.

The SRC is in serious disagreement with the other four research councils, none of which bulwark such drastic measures are necessary. All the councils are worried about a high new anti-inflationary device. The Government plans to use to control public expenditure next year, but no council knows yet how it will affect its budget. The SRC has adopted the most pessimistic interpretation while the Social Science Research Council is pressing on with plans for modest expansion.

Heads of the SRC research boards met Sir Sam Edwards, the chairman, last week to discuss how cuts of between £7m and £10m could be accommodated.

The new levies, known as "cash limits", will mean severe restrictions on all public expenditure, including the whole of higher education unless inflation is contained. It was foreseen in the July White Paper *The Attack on Inflation* which urged: "There is a range of expenditure where cash limits can impose greater financial discipline and precision, and where they can contribute to countering inflation by making it clear to both programme managers and to suppliers that the Government's purchases of goods and services will have to be cut back if prices rise too high."

This means that in public expenditure the Government will decide in advance for what rate of inflation it is prepared to provide compensation. If inflation rises above that level, no more cash will be forthcoming.

In the Commons in the past two weeks Mr Wilson and other ministers told the Government was making rapid progress to fixing cash limits in important areas of public expenditure.

There is little doubt that cash limits will be applied to research council expenditure as well as other areas of higher education and the Government and Treasury are now involved in the final discussion to fix the level. The problem is to find a balance between a level which would feed inflation and a level which would cripple spending authorities if inflation were not adequately checked.

Source close to Government agreed this week that the most likely level for the research councils was 10 per cent, in line with the Government's intention of reducing inflation to that level by next summer.

Cash limits are not expected to apply to salaries or subscriptions to international organisations so the chief effect of cuts due to inflation will be on research awards, grants and capital expenditure. For the SRC, this amounts to about half the annual budget of £25m (at 1974 survey prices) which is why the council is so worried.

## Birmingham posts cut by 10 per cent

Teaching and research jobs at Birmingham University have been cut by nearly 10 per cent. The university has formally established 120 posts from September 1, 1976, and the beginning of this term.

The formal abolition of 20 teaching and 50 research posts in various faculties will free the university's hand for expansion in other areas at a later date.

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## 100 may lose jobs in poly merger

by Frances Gibb

More than 100 lecturers face redundancy as a result of the proposed merger between Newcastle Polytechnic and Northern Counties College of Education.

Last week Newcastle's education authority agreed to a reduction in the number of lecturers at the polytechnic and college from the present combined total of 167 to about 65 by 1979. This proposal was based on the assumption that the merger, which is still under discussion, takes place by next September.

The cuts will keep the staff of the polytechnic at 110. Full-time lecturers are to be cut from the polytechnic by 25, the college by 15, and 10 Northern lecturers will be cut.

The authority outlines four possible ways of reducing the staff: by cutting the number of lecturers, by cutting the number of courses, by cutting the number of students, or by cutting the number of other staff.

Staff will be encouraged to volunteer for redundancy and to accept voluntary redundancy without loss of pay. But there will be no compulsory redundancies without at least 12 months' notice, the authority says.

A spokesman for the polytechnic said: "Because of the Government cuts in student numbers this problem would have arisen anyway without the merger. But the figure of 100 is high and it is unlikely that all the staff will be absorbed in the polytechnic."

He pointed out that it would cost the authority an average of £8,000 to retain a member of staff to teach another subject, although this money was recoverable through the teaching training pool.

Mr R. H. Shaw, vice-principal of Northern Counties, said the figure was no surprise. "It is generally expected that this is the sort of problem we have got to cope with. It is so worse than anywhere else."

The proposals recommend that full-time equivalent teaching staff at the polytechnic, this term he reduced by four-and-a-half and at the college by eight. They have already been redeployed within the polytechnic.

By next September, polytechnic staff are to be reduced by 20 and college staff by 21; by September 1977, assuming the merger has taken place, the total to be found on other posts would be 68; by 1978 it would be 61 and by 1979 101.

Mr Jock Chadderton, Newcastle's director of education, said that not to have published the proposals would have created an unnecessary amount of anxiety. "Whatever we would have done, we would have been criticised. But the aim was not to create alarm and despondency, but rather to remove doubt and anxiety."

He said it was too early to estimate how many lecturers would be found other posts or made redundant.



# Change financing of foreign students-MP

by Sue Reid

A radical change in the method of financing overseas students in Britain has been called for by Mr William van Struubenzee, former Minister of State for Higher Education. He has appealed for foreign students to be financed out of the overseas aid programme instead of the education budget.

Speaking at Newbury, Mr van Struubenzee, Conservative MP for Wokingham, said that more than 62 per cent of foreign students in British universities were from developing countries.

"This leads me to suggest that we should consider a radical revision of the manner in which we finance this effort. While at course the effort is educational in the sense that it is the educational service that looks after the students, the financial effort is more properly one of overseas aid."

Accordingly, he said, the programme would be more appropriately financed out of the overseas aid budget and removed from the educational one. Such a change, he added, would be a response to the recent call by Mr Prentice, Minister of State for Overseas Development, for a change of emphasis in Britain's aid policies.

It was understandable that when a crisis should be heard calling for a reduction in the number of overseas students or sharp increases in the fees they paid. This, said Mr van Struubenzee, was more understandable when the increase in the number of overseas students in recent years was realized.

However, while calling for a change in administration, it was important not to let pressing economic difficulties stampede Britain into massive cuts in aid in terms of overseas students. These students contributed to the universities and colleges where they studied.

In a parliamentary debate on overseas aid on Friday Mr van

Struubenzee repeated his demand that the responsibility for financing foreign students should be transferred from the Department of Education and Science to the Ministry of Overseas Development.

In answer Mr Bryan Davies, parliamentary private secretary to Mr Mulley, Secretary of State for Education, said there had to be an interdisciplinary approach to the problems which Third World societies were facing.

This required a shift from a research contribution operating in rather narrow channels to a wholly new perspective directed to the problems of rural development. He recognized the contribution already being made in this respect by the universities of Reading and Sussex.

Mr Davies criticised the Technical Education Council for not making sufficient impact upon areas of education below higher education and added that the rather limited role of colleges of education should be developed to provide the basic education necessary in the context of developing societies.

The "open door" feature of the British education system with regard to higher education opportunity was praised by Mr Davies, but he added that the policy should be extended to enable students at lower levels to gain access to educational opportunity.

The National Union of Students this week claimed that campaigns were under way to drive foreign students out of the country. It alleged that "new and frightening" restrictions had been introduced in Britain designed to harass overseas students.

The coincidence of extra regulations, added charges, restricted restrictions and public attacks by politicians could hardly be accidental, said the union.

The NUS quoted a letter from the Department of Employment which claimed that if British-born labour were available for vacation jobs, foreign and Commonwealth students



Mr van Struubenzee.

would have to be refused. This, said the union, made the possibilities for overseas students without private incomes very bleak.

It cited Sunderland Polytechnic, Mid-Essex Technical College, Bradford University and Leicester Polytechnic as institutions where overseas students were paying much higher hostel fees than home students.

It also claimed that a confidential document from the Inner London Education Authority had called on colleges not to increase their foreign student intake.

Mr Charles Clarke, NUS President, said last week: "The British Government is clearly adopting a policy of only giving education to that minority of Third World students who can afford massive fees."

"This is bad for education in this country. It destroys any belief that Britain wishes to help Third World countries which have been exploited by British business for hundreds of years. It contradicts directly the principle of aid for the poorest to which the Ministry of Overseas Development has given priority."

# City University overstaffed, vice-chancellor says

by Alan Cane

City University is substantially overstaffed and needs more students and more and better research, Dr E. W. Parkes, the vice-chancellor, says in his annual report, published this week.

He points out that the university has been particularly vulnerable in the swing away from science among sixth formers and says: "Some departments have maintained their undergraduate numbers successfully, but others have failed to do so. As a result the university is substantially over-staffed in relation to its student population."

The report shows that City has a full and part-time undergraduate population of 1,824 and a postgraduate population of 566. On this basis the overall staff:student ratio is about 1:7. The overall staff:student ratio for British universities is about 1:9.

Dr Parkes says the university must develop new courses to attract more students, utilizing only the staff at present in post. "Some retrenching of staff will be necessary and in order to free staff for new developments, we must cease to offer courses and appoint where the number of students does not justify the manpower involved."

He says the value of research in the university is too low, and the favourability of student ratio should allow an increase in research and postgraduate work.

Dr Parkes says that because the university has been allocated a fixed sum for 1975-76 its fortunes depend entirely on the Government's success in dealing with inflation. On the staff side, he complains that composition from the public sector and the professions means it is difficult to attract candidates of adequate calibre for academic posts.

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# 'Professors are worth £20,000 a year'

by David Walker

An economics professor this week devoted his inaugural lecture to explaining why university professors should earn close to £20,000 a year.

He concluded his lecture with an attack on the Association of University Teachers, saying that academics would be better advised to pay their unions dues to Oxfam.

Professor G. D. Newbold, of the Management Centre at Bradford University who specializes in managerial economics, used slides and diagrams to explain what had happened to professors' pay between 1965 and 1975. He said they had lost at least £3,500 and perhaps as much as £11,000.

On one scale of salary comparison, he estimated that professors should get £12,584 in 1975 in keeping pace with inflation. However, if a professor's current salary were adjusted to include an average share in the real growth of the economy together with an allowance for price changes between 1965 and today, he should get £19,411.

To keep abreast of a manual worker's average earnings since 1965, the professor's salary would have to increase by nearly 120 per cent.

Professor Newbold made many salary comparisons with that of a

# Lecturers see danger in closed shop

by Peter Wilby

Some university and polytechnic lecturers believe that the dangers of closed shops being imposed in higher education are even greater than in the press.

The Association of Polytechnic Teachers is considering a major publicity campaign on the issue. Mr A. J. Paimon, the APT's publicity officer, said: "Many people in higher education have two functions: teaching and management."

"If the closed shop were imposed, and there were any conflict between these functions, the trade union would be able to resolve it to its advantage without any recourse to arbitration, simply by using its disciplinary powers. Can you imagine what would have happened to the authors of *The Rape of Repton* if there were a closed shop?"

Mr Paimon said that recent incidents at the polytechnics of North London and the South Bank were a warning. In both cases, heads of departments opposing the union line could have been expelled and thrown out of a job.

"If we have a closed shop in higher education, unions will be able to win what they desire by threatening the removal of membership," said Mr Paimon.

# Lecturers see danger in closed shop

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# Seminar told of Chilean torture

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The seminar, jointly organised by the NUS, the International Union of Students and the Committee of Presidents of the Federation of Universities in Chile, was attended by 90 delegates, both academic and student, representing more than 50 organizations throughout the world.

Its objective was to highlight the alleged violation of rights of students and academics during the past two years, the structure of the Chilean education system and the alleged torture and repression by the military.

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# London University hangs fire on Murray bill

by Sue Reid

London University will not submit a private Bill to Parliament this autumn. Promotion of the long-discussed Bill, a preliminary to major constitutional reforms of the university, has now been deferred until November, 1976.

In the fourth report of the university's consultative committee, set up to promote discussion on the Murray Report, a "simple" Bill, devoid of statutes, is proposed for next year.

The main aim of the Bill is to free the university from one of its "fetter" sections of the University of London Act, 1926, which strictly limits its statute-making powers. Once the Bill is passed the university will be able to draw up statutes and make the constitutional reforms it wants.

The main proposals for future changes of the university's constitution are outlined in the consultative committee's report entitled *The Way Ahead*. They include suggestions for more teacher representation on the university court and a change in the system of electing teaching staff to senate. The committee proposes that academic staff should be elected through special

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# Tories and NUS united on parents' grant contribution

by Sue Reid

The Conservative Party and the National Union of Students joined hands this week in the question of abolishing parents' contributions to students' grant.

Mr Norman St John-Stevens, Opposition spokesman on education, promised that a Conservative government would abolish the parental contribution and welcomed recent statements from the NUS which were "fully in accord with Conservative policy."

He said: "There is no justice in a situation where students are deprived of their full grant because of the existence of a national contribution which many parents are either unable or unwilling to pay. The financial plight of students is all the more acute because of the drying up of vocational jobs because of the recession."

Another source of strain on students was the lack of accommodation. Mr St John-Stevens promised that a Conservative government would develop plans to make made in a number of recent speeches.

Re argued that universities were threatened from within and from the outside. Public support for them had been eroded by the violence and intolerance of unrepresentative student minorities. Instead of offering support, the Government in the guise of Lord Crowtham-Hunt had offered only the superstition and lunacies of manpower planning.

Mr St John-Stevens said the universities were serving the nation well, coping with increased student numbers from less and less resources. Their achievements were being jeopardized by inadequate public funding at the very time when support from private sources was also drying up.

He paid tribute to the universities' research work, without their advanced work the discovery and exploitation of oil in the North Sea would never have been possible, he said.

# Lend lecturers to schools call

A dean of science has proposed that university lecturers in departments short of students might be seconded to secondary schools with a shortage of teachers.

Professor A. K. Holliday, Grant professor of inorganic chemistry and dean of the science faculty at Liverpool University, has written to all five local education authorities on Merseyside suggesting that university teachers might be seconded to local schools for up to a year.

His scheme has the blessing and encouragement of Dr T. C. Thomas, Liverpool's vice-chancellor.

Professor Holliday's letter suggests three ways in which the university could help the schools.

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# Future Workshops from UTMU

Simulations Workshop. This workshop is an attempt to respond to the growing demand for more information about, and skill in, the design and operation of simulations, games, etc., and will be concerned with simulations as a form of classroom learning. It aims to provide participants with opportunities to become familiar with the range of existing materials; to evaluate the use of simulations for their own teaching; to experience the benefits and difficulties associated with simulation methods; to get some experience of actually running a simulation.

4/5 December 1975. Fee £16

# Future Workshops from UTMU

Student Selection and Recruitment. This short course is intended for academic and administrative staff involved in the selection of students. Both the organization of recruitment and selection procedures and the conduct of interviews will be considered. Participants will be invited to work on a scheme of selection and recruitment suitable for their own departments. They will also interview a number of students or through they were university applicants, this session being recorded on video-tape in order to allow for the structure and technique of the interviews to be considered.

15/18 December 1975. Fee £26

# Future Workshops from UTMU

Effective Lecturing. This course is designed to help lecturers in higher education recognize and develop their skills in lecturing whilst maintaining an awareness of the shortcomings of the lecture method. With the use of video-tape participants will be encouraged to develop a model for self-improvement which they can operate at leisure in their home institutions. Participants may also examine their skills in delivery with close guidance from effective speaking tutors.

5/7 January 1976. Fee £18.50

# Future Workshops from UTMU

Details of all 3 workshops, plus the programme for UTMU spring study groups, can be obtained from Gwen Henthall at the University of London Teaching Methods Unit, 35 Gordon Square, London WC1H 0NT, telephone 01-580 6451.

# Future Workshops from UTMU

Denise Donoghue on T. S. Eliot: Anthropology books. Patrick Nutgens: schools and poly. Trevor Marshall: are university teachers working class? Profile of Arthur Vick

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# British Association for Commercial and Industrial Education

BACIE is holding a special national conference with the co-operation of the Manpower Services Commission and the Training Services Agency on: (1) The short-term steps being taken by the Government in face of growing unemployment of young people; (2) The longer-term proposals contained in the MSC/TSA discussion paper *Vocational Preparation for Young People*.

17 December 1975 at the Royal Lancaster Hotel, London W2

Chairman: Sir Denis Barnes, KCB

Chairman, Manpower Services Commission

Other speakers include J. S. Canals, Chief Executive, Training Services Agency; M. O. Bury, OBE, Director of Education, Training and Technology; CBI; Mrs M. Pellareon, OBE, Immediate Past Chairman, TUC General Council; and F. Melcalis, CBE, Director, Engineering ITB.

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## Love's labour's not lost if OU has its way

by Frances Gihli

Anyone at the Open University for whom the subject of love is a burning passion will be able to give vent to his feelings at an open seminar to be held at the university within the next month.

Love is provisionally accepted by the Open University courses committee this week as a subject for an inter-disciplinary course. The next stage is to form a course team from among interested staff members and elected student representatives who attend the seminar.

The course is the brainchild of Mr Alan Harris, lecturer in the department of educational studies and author of the recently published book *Teaching Modality and Religion*.

"I asked myself what was the most important subject that could possibly be studied as an inter-disciplinary course," he said, "and it occurred to me that, first, 'interpersonal relationships of students' were obviously very important to them, and second, the concept of love had not been very profoundly explained by philosophers."

The course would be academically on a par with other Open University courses and would embrace a range of disciplines: psychology, social psychology, anthropology, ethnology, moral philosophy, philosophy of mind, human biology and educational theory.

## NATFHE still seeks right man

A £7,600 post on higher education officer for the new 60,000 strong National Association of Teachers in Further and Higher Education is to be re-advertised shortly because of a dearth of suitably qualified applicants.

Only one person was found to have qualifications suitable for the job and he turned down the post. A spokesman for the Association of Teachers in Technical Institutions

"It would aim to promote a greater understanding of personal relationships as a parent, friend, lover and member of the family," Mr Harris said.

The course would not promote a particular moral view. "In any educational process one looks critically at existing ideas and fosters the student's ability to question for himself. There will be no stance taken by the course on appropriate attitudes to sex. The only stance would be that greater knowledge and rationality are a good thing."

He envisaged as many as 2,500 applicants for the course. "It will have broad appeal, but in particular I expect housewives with children to apply," he said. "It might even be the first Open University course to make a profit."

When elected, the course team will work out the details and recruit students to the courses committee. If accepted, the course would be on offer by about 1979. It would count as a half credit.

Mr Harris sees the course falling into five sections: infancy, friendship, sexual love, marriage, and the family. Emphasis will be on comparative studies between different ethnic groups, and on the educational aspect: how, for instance, sex or religious education could be more effective.

confirmed that only five candidates caucused the short list.

The new appointment would be responsible for combining existing higher education work of the ATTI and the responsibilities for staff in the former colleges of education, previously covered by the Association of Teachers in Colleges and Departments of Education.

The salary scale ranges from £6,231 to £7,632.

## Miller and students square up again

A new round in the clash between students and the director at the Polytechnic of North London broke out last week with sweeping attacks from each on the other in *Pulse*, the student newspaper.

Mr Miller launches into stinging criticisms of the "aggressive" and "clutch" of the "sad grey" of the polytechnic, which he says break for one and for all. "These characters have to prove their manhood, why don't they climb up the outside of the towerblock or jump out of aeroplane? Bleating out political clichés to the faithful is really a pretty credulous way of getting one's complexes," Mr Miller writes.

"Presumably some few eager beavers find it all tremendously fun, even though the level of the third-year student is really in the middle, a bit tedious."

He ends one review of the student body to action, he says: "It really

does astound me that out of a student population of nearly 4,000 there cannot be found even 400 individuals capable of sufficiently constructive thought and action to 'vote the rascals out'."

The achievement of the student union officers include "some rather pathetic demonstrations which have always fizzled out in feeble destructiveness and untidy failure; and an immense volume of pseudo-political verbiage 'full of fury and indignantly nothing'."

They should occupy themselves with more useful activities such as putting some of their spare cash into forming a housing association and setting up creches, Mr Miller suggests.

"We are supposed to be grown-ups at 18 nowadays - why then expect everything to be done for you like a bunch of helpless dimwits screaming for their nappies?"

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## 'Restore theology to central place in universities'

by David Walker

University education should have a place for "mystery" and the great questions of the universe, a former professor of education and leading Christian says in a new book.

Professor Roy Niblett, formerly at the Institute of Education of London University, says in a contribution to a memorial volume for the late Dr Alan Richardson, Dean of York, that theology is an intellectual and imaginative subject, concerned with great questions of human destiny, the "intention" of the universe and the nature of God, and it has a central place in the modern university.

"Today our open and plural society, using a hundred technological means for the solution of its problems, requires large numbers of graduates equipped to cope. But the higher education they receive may not have involved 'the great questions' of the universe."

"This makes it all the more important that in whatever place of higher education they are members, there should be subjects which conspicuously face 'such questions'. Theology is one of these."

Professor Niblett makes a plea for theology to keep in touch with the "rooming imagination" and not to be an empty exercise as some university departments tend to do. The importance of ascertainable and objective evidence.

"Some of the most fashionable departments of theology are among those concentrating exclusively on phenomena that can be examined historically and sociologically for their truth as if every kind of truth were detachable from imagination, or as though truth could be important if importance itself were not."

Professor Niblett develops his view of the place of theology into a critique of some aspects of modern higher education. The Robbins Report, he says, rightly emphasized the need to expand higher education but paid too little attention to the consequences of educating two and a half times as many students in a society of less and less sure what the transmission of a common culture meant and what "the general powers of the mind" include.

"The division of higher education into two sectors is a mistake. If it is more than a passing phenomenon, but if the division is to be halted, the universities will have to allow a good deal more willingness to be concerned about questions of value, to give a coherent lead, than they have yet done."

Theology and Change, Essays in Memory of Alan Richardson, edited by R. H. Preston, SCM Press, £4.50.

## APT claims colleges devalue name of higher education

The new colleges of higher education represent a devaluation of the term "higher education", an editorial in the November bulletin of the Association of Polytechnic Teachers claims.

Those institutions (numbering about 50) call themselves institutions of higher education but are formed from the amalgamation of establishments of a lower level, it says. "This is devaluing the term 'higher education'."

The article suggests that to clear up ambiguities the term "polytechnic education" should be used. Negotiations between APTA and the five polytechnic directors ended last month with agreements which would safeguard academic staff from further cuts. All five polytechnics took cuts of between 12 and 25 in staff establishment this year.

The largest staff cut, proposed for the Polytechnic of North London, will actually mean an improvement in staff for the rest of the polytechnic.

The polytechnic has agreed to accept the end of 39 posts staffing an emergency social work training course which was due to finish next year. In exchange four new posts will be created in other areas of the polytechnic.

FLEA turned down proposals to create 10 and 18 new posts respectively at the City of London and Central London Polytechnics, even though both institutions agreed that student admissions were rising.

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## 'Who rapes reason now?'

Yours faithfully,  
RALPH HARRIS,  
Churchill Press,  
c/o 2, Lord North Street,  
London, SW1.



Sir,—As one who worked as a full-  
 time staff member of the National  
 Union of Students for five years,  
 I am acutely aware of the low  
 movement during that time of the  
 the national and local unions.

It is known that Francisco Franco and a bevy of equally odious Brazilian, Uruguayan and Chilean generals are keen practitioners of sentencing their opponents to death.

Yours sincerely,  
DOUGLAS COKER,  
Smilo Stoen  
Paisley.

on behalf of the summa-  
since of National and Univer-  
Libraries,  
moco letters, page

**John Griffith**  
The author is professor of public law at the  
London School of Economics.

## The real enemies: class, status and power

the wreckers have concentrated on the weaker and less prestigious institutions. The London School of Economics has been a prime target, and the colleges of education have been virtually untouched. And let us further be cloak with respect to the good intentions of our declared friends that the paving of the road to hell could be moved to happier highways if we examined our situation with care. . . .

Johnson's analysis turns mainly on two

If, on the other hand, universities are irrelevant to the material wealth of nations, then though they can reasonably expect autonomy as to their internal life, they cannot legitimately claim the right to determine what resources are to be put at their disposal for those remains, in effect, welfare payments.

Only if a third alternative is adopted in which the university is sharply and purely

**A. H. Halsey**

*The author is director of the department of social and administrative studies at Oxford University.*

Next week: further replies from John Haffey, Martin Jacques, Michael R. D. Young and Bernard Williams.

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## Towards the 1980s-I: The problem of Scuncheonster

Too much of Britain's system of higher education is in a mess. Universities still have thousands of empty science and technology places. This is not their fault, but they are empty nevertheless. Academic staff have been demoralized by the treatment of their salary claim and their deteriorating conditions of work. University budgets have been pinned so ruthlessly that there is almost no left—no and the quality of research is continually threatened. Only in some science and engineering departments is there any pre-eminence—and only in these departments are entry standards dropping (though what matters is not so much standards of entry as standards of exit, which seem to be as high as ever).

In spite of the view that it is still wilderness in the political parties and in industry and commerce, universities are now the most efficient and the most effective sector of higher education. Not only are they good universities, many of them are also good polytechnics. If industry and commerce were as efficiently managed as universities, Britain's economy would be much healthier.

The colleges and polytechnics are also demoralized, mainly because they do not know where they are going or are not going in the direction originally intended by the Government. Since they have been unable to recruit to science and technology degree courses, arts and social sciences have been developed and expanded so that most polytechnics are really liberal arts colleges, with a higher proportion of students in the social sciences and humanities than the universities. Many staff have to work in desperately cramped conditions. Only a tiny minority of students can live at home. More and more polytechnics are therefore likely to become regional rather than national institutions.

The difficulties of the polytechnics, moreover, will only be made worse by the creation of the 50 colleges of higher education that are now being created. These colleges will absorb the polytechnics of most of the other colleges will only be the balance will further in the direction of arts and social sciences (however much courses are dis-

gusted as "applied" arts and "applied" social science). So the paradox is that it is the non-university sector, the sector under direct local and national political control, that is inefficient and floundering.

Such a development would not have mattered so much in the sixties or the 1970s, when it could be argued that expansion would sort out the mess. Student expansion, however, has slowed down and it is unlikely that it will ever again be as dramatic as it was in the 1960s. The Government, moreover, is desperately trying to curb the growth of public expenditure; and since education is the second biggest consumer of public expenditure, it is likely to be hit hardest.

Under such conditions attention will soon turn to the situation that there is now in many cities and regions of Britain, where one or two universities, a polytechnic and one or two colleges of higher education, situated almost side by side, are offering many of the same degree courses and competing for the same students. A fairly typical, if in this instance hypothetical, situation is that Scuncheonster University admits 50 or 60 students to a French, psychology or chemistry course, Scuncheonster Polytechnic next door admits 10, 20, or 30 students to a French, psychology or chemistry course, and then, Scuncheonster Higher Education Institute, a small and near the green belt, will be admitting 30 or 40 students to its BA (Hons) degree. Scuncheonster University, Scuncheonster Polytechnic, and Scuncheonster Institute of Higher Education, moreover, will each have a staff of about 100, and each will have a staff of five to 15 departments to teach French, psychology and chemistry.

This is not always a nonsense, but it is generally a nonsense and it squanders money that could be spent elsewhere in higher education, on schools or houses or hospitals or new factories. It is not so easy, however, to suggest a solution or to suggest where we go from here. The THEs will nevertheless return to this subject next week.

### Academic publishing

from Mr Philip Allan

Sir—I am pleased that my article (THEs, September 19) about academic publishing has stimulated further discussion about its problems. For us, the publisher of the less conventional ideas now being put forward will prove to be of lasting benefit.

The various critics of my schisms attacked it at different points and with contradictory reasoning—thus, I feel, reinforcing my view that the point is practicable. When some say your cuts are too high and others that they are too low, the changes are you have got to make.

Of course, in a short article one cannot deal with all the problems. Certainly the preparation of copy needs a lot of care, but this is not a very recent innovation. If in my time one experienced man were to handle only 12 short books a year, there should be plenty of time for him to help authors with such difficulties as may arise.

I never claimed that cuts in my figures were not real. I stipulated a totally non-profit-making operation and I specifically mentioned these costs (in terms of free provision by an interested party). The point was making it simply that if the academic community does enough about good work which is no longer of interest in commercial publishing, something can be done to avert a little lunacy and some neatness from the academic world.

However, one should not expect much encouragement from the larger established publishing houses. When new ventures are mooted, their advice—as experience has taught me—is likely to be

Yours faithfully,  
PHILIP ALLAN,  
Philip Allan Publishers Ltd,  
Deddingdon,  
Oxford.

### The case for Christ's College

from Mr John Mottram

Sir—One applauds Sir James Richardson's condemnation of self-defeating financial controls in the case of university buildings, which should be characterized by excellence. (THEs, October 17).

Much designing is exclusively in answer to constraints, to the point where meaningful elegance in the selection of relevant and relevant materials and financial controls displaces the architecture of contemplation, feeling and involvement.

One is however surprised by the omission from his apparently catholic selection of post-war Oxford and Cambridge college buildings of Denys Lasdun's building for Christ's College, Cambridge.

By any realistic standards it was not expensive. It has a place in the development of stepped buildings, designed to fit in an unexpected amount of overcongruence which is liked by those who live in it, and it has visual surprises and satisfactions of a high order.

## LETTERS TO THE EDITOR

### Sir Toby answers Paul Johnson

from Sir Toby Weaver

Sir—This baiting of bureaucrats is becoming as popular and unedifying as was once that of bears. In the second of his articles on the universities Mr Paul Johnson (THEs, October 31) started with derogatory intent, first, that as a civil servant I was a social engineer; second, that I have advocated a scheme in which "universities would be grouped with polytechnics and education colleges and administered on a regional basis." Third, in his last article he quotes in a similar vein the statement of a vice-chancellor "never once met" me. (Nor, for that matter, has Mr Johnson.)

The facts on these three points are as follows:  
● In a speech at an Organization for Economic Cooperation and Development conference in Paris in June, 1972, I said this of our universities, colleges and schools: "Continue to adopt them we shall. But what we must resist in any so-called strategy which demands that insensitive destruction to make room for a giant educational network whose origins we question, whose foundations we suspect and whose destination we distrust. We do not think of education in terms of social engineering."

● In a public lecture at Rotherham in March, 1974, I said this about a proposal that was being canvassed to amalgamate all the higher education institutions within a single institution: "This alleged solution would leave some 15 per cent of post-tertiary learners in what would,

In our stratified society, be seen as U, and 85 per cent in non-U institutions—an odd way to abolish the binary system. I have said the problems of managing institutions of the formidable size envisaged running into not thousands but tens of thousands of students."  
● On his own initiative the vice-chancellor concerned met me in 1972 to put some proposals to me. Courtesy required that I should liaise closely with the vice-chancellor on a cursory honorem of universities with Bristol—justly—at the head of the list, let me disabuse them.

Finally, as to Mr Johnson's charge that in respect of the increasing sums of public money granted to the universities (or rather civil service) finger pointed greedily into the succulent pie it had created, "he might, in his pursuit of truth, have added the following view expressed by Lord Ashby in the course of a public lecture in 1968 entitled 'Hande off the University': 'Whose hands? The civil servants in Curzon Street have behaved with admirable propriety; there is not any evidence to support the assertion that the DES is imposing its deadhand (as one critic calls it) on the university. The hands, whether alive or dead, are not the hands of civil servants.'"

Yours sincerely,  
TOBY WEAVER,  
Vice-Chancellor,  
London W8.

### Bristol's finances

from the vice-chancellor of Bristol University

Sir—Least any of your readers should be misled by your brief report (THEs, November 7) that Bristol is running its accounts to credit into thinking that we have discovered the philosopher's stone or that the University Grants Committee has adopted the widely canvassed proposal that there should be a cursory honorem of universities with Bristol—justly—at the head of the list, let me disabuse them.

We have achieved this happy state of affairs simply by running down the university's 62 vacant academic posts since 1948, the last count. But should any of your readers believe that I or my colleagues think that this is a sensible way to run a university, a university in which, even a century, ago, they would be wrong.

Yours faithfully,  
ALEX MERRISON,  
Vice-Chancellor,  
Bristol University.

### University libraries

from Mr Peter Durey

Sir—Nicholas Moore's article on University Libraries (THEs, October 24) really will set me. It reveals an extraordinary lack of knowledge of the recent history of British university libraries.

To read the report of the Committee on University Libraries published by the University Grants Committee in 1957 would in itself correct the misleading impression, which Mr Moore gives, that thought on the nature of university library collections and their staffing and on regional and national cooperation brought about by economic stringency.

It is nonsense to claim as he does that until recently the primary objective of British university libraries was to build up a stock as large as possible. In fact the primary objective of British university libraries in the post-war period has been to build up a stock of books and journals which would be of use to the needs of research workers and undergraduates in the university communities they serve.

This has been no easy task, in the face of very considerable financial limitations throughout the period. It is instructive, for example, to compare the financial resources made available to the libraries in the early 1950s with those in the early 1960s. The latter were more than double the former.

I do not believe that British university libraries need feel ashamed of their involvement in regional and national co-operation. There are a number of instances of long-standing schemes and it was the impetus provided by the universities which eventually led to the creation of the British Library.

Emphasis of the role of the university library staff in the expansion of the collections can be traced at least as far back as the early 1960s, when the new university libraries were founded. The staffing of almost all the new university libraries was based on the staffing of the old university libraries.

Even a cursory reading of the literature would show that the deliberate change in the philosophy of librarianship and nothing to do with economic pressures.

In short, Mr Moore's comments appear to me to be a gross misrepresentation of the role of university libraries in the post-war period. The image of the British university library as a place of stagnation and backwardness is a gross misrepresentation of the role of university libraries in the post-war period. The image of the British university library as a place of stagnation and backwardness is a gross misrepresentation of the role of university libraries in the post-war period.

Yours faithfully,  
PETER DUREY,  
Librarian,  
University of Auckland,  
New Zealand.

## A passionate vision of nature, dated by style and form

Andrew Causey discusses the changing fortunes in the reputation of Paul Nash, a major exhibition of whose paintings opened in London this week

The Paul Nash exhibition which opened at the Tate Gallery this week is the first comprehensive showing of his work since his death in 1948. It is a tribute to the artist's reputation among painters, but it was to prove short-lived, soon to be eclipsed by the different achievements of the best new painting of the 1950s.

His late paintings, romantic landscapes infused with personal symbolism, on which his reputation was founded, were remote from the preoccupations of younger artists after 1950, and despite the remarkable energy of his widow, Margaret Nash, his reputation until his death in 1948, his influence underwent a more drastic decline than that which ordinarily follows an artist's death.

Only in the past few years have shifts in artistic sensibility indicated that the time may have come for a full-scale presentation of Nash's art. Nash was born in 1889 and his career as an artist ran from 1910 to 1948. His earliest pictures date from the years of Regency's post-impressionist exhibition at the Tate Gallery (1910 and 1912), which were seminal to the creation of a modern art in England.

Nash did not immediately follow, developing at first a highly individual method of landscape drawing with vigorous overtones, and beginning to assimilate European modernism only when, as an official artist at the front in 1917, his experience of the horrors of the war forced him to abandon some of the privacy of his earlier work and evolve a more direct and demonstrative style.

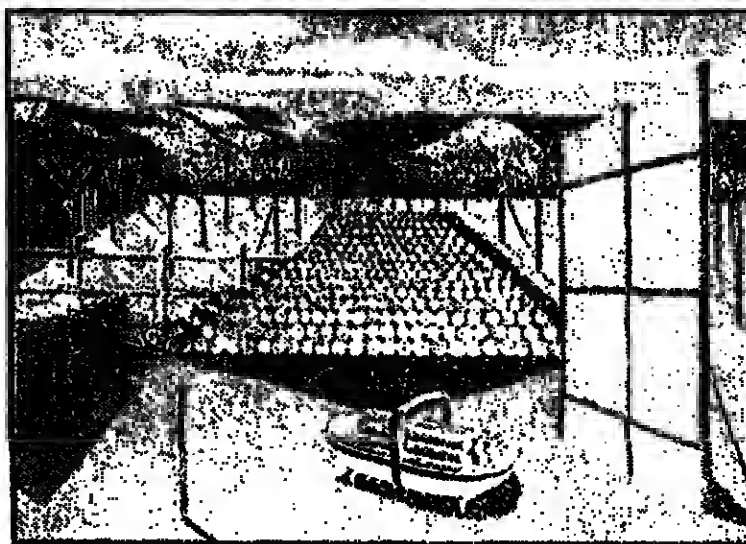
In the twenties and thirties Nash gradually, and not without difficulty, came to terms with post-impressionism, cubism, metaphysical art and surrealism. But he learned the various languages of modern art in order to make them work for him in a personal way, and the element of privacy in his work before 1914 never completely disappeared.

Nash's was a passionate vision; the depth of his feeling has never been in question, but the methods he developed to express it have given occasion to artists and critics on the grounds that he picked indiscriminately among the modern styles to find clothing for his ideas.

He is no longer the courtly figure he was in his lifetime. His style should be seen to view Nash's contribution more realistically and acknowledge the subtlety with which he used modern art forms to subvert and enlarge the traditional landscape painting in a sense he wanted to convey to his painting of the power and vitality of nature.

The Second World War destroyed the ties with continental art that Nash and a handful of others had cultivated over the previous decade. The crucial link with Paris, which in his last years Nash, though by then a chronic osteoarthritis, used to keep with war conditions, only at the expense of considerable suffering, was severed. In his last years, the only time in his life his pictures sold as fast as he could produce them, and as he was encouraged by the growth of a personal artistic following.

Nash's reputation at his death, largely on a result of his efforts around Nash's art. His correspondence with the poet and playwright Gordon Bottomley, a friend from 1910 till his death, was published in 1955 and reinforced Nash's reputation as a writer, while his earlier work, more intimate and personal, revealed his sensibility and sense of humour, the curious naivety that survived into his adult years, his personal vulnerability and, especially in early life, his unusual dependence on close friends.



"Landscape at Iden" by Paul Nash.

George Wingfield Digby, in his long essay on Nash in *Meaning and Symbol in Three Modern Artists*, also published in 1955, recognized parallels between Nash's painting and far eastern—especially Chinese—art, and was the first to link Nash with Jung, perceiving that Nash's art was not only of its time but also part of a world-wide and ageless cultural pattern.

Nash reflected imagery from innumerable sources and, while the acts of acquisition were not generally backed up by any detailed research into the sources, his use of the images, their incorporation into his art was not casual; images were used to amplify and develop the iconographical structure that Nash knew he was building.

The third publication of 1955 was Anthony Bertram's authorized biography. Bertram was a friend of Nash from 1922, when he had written the introduction to the first monograph on Nash's work. Bertram's book is in many respects a masterpiece, a detailed portrait based on letters, interviews and personal documents, commendably accurate and unlikely ever to be superseded.

As a character study it was criticized by some who knew Nash partly on the grounds that it neglects the religious and Catholic doctrines and texts accorded to attribute Catholic beliefs to Nash, who had no definable religious convictions.

But the breadth of Bertram's understanding, especially his knowledge of poetry which was one of the mainstays of Nash's inspiration, led him to realize that Nash's comparatively unworldly life and the formal development of his work could not by themselves establish a whole or truthful picture.

Without endorsing Bertram's rather individual emphasis on religion, it is possible to pinpoint traits in Nash's art—the way it reflects his sense of ubiquitous energy, his feeling for the power of darkness and his interest in the subject of sacrifice—which were brought out by the First World War, that make analogies with Catholic tenets plausible.

Around 1950 a period in English painting came to an end. In the first decade of the century England had needed the continental influences that were to lead to Bloomsbury's post-war modernism, and in the late twenties had been released by European modernism from the rut of post-impressionism.

Similarly, in the 1950s a comparable renaissance of English painting took place, assisted at first by post-war Parisian painting and subsequently by the New York abstractionists.

English painting was virtually re-born in the 1950s, and it is not surprising that Nash was forgotten. It was not that his sensibility was irrelevant; there were still painters who experienced nature as he did, as something ubiquitous, forming the embrace not only for human activity but for the nurturing of consciousness.

But while Nash had worked from the standpoint of an artist to whom cubism and surrealism were new discoveries, the artists who followed him were established elements in the syntax of art, available for use and development but no longer adequate to themselves for the expression of ideas.

The kind of framework for an assessment of Nash that writers like Digby and Bertram began tentatively to build in the mid-fifties may be difficult more precisely

He does not have, like Henry Moore, a world-wide reputation based on a style of work formed two decades or more ago, from which younger artists have often felt the need to dissociate themselves.

Sculptors in the sixties sometimes played down the work of Moore, even when it was visible in their work, but no painter ever needed to repress his influence that he was not painting like Nash. Though Nash could still be alive today (aged 86), he will be viewed as the last of a kind, a well-established master, which increases the likelihood of judgments being dispensed.

A Nash revival, in the sense of his art becoming directly imitated, is improbable and certainly undesirable. In terms of painting style Nash was committed to the problems of his own period, and it would be pointless for artists to rework that ground now.

But Nash's sensibility, his attitude towards nature, and especially landscape, is still relevant, and his work can still relate to aspects of contemporary art in this respect.

The Tate's small exhibition in 1973 of his photographs pointed to a link between the approach to landscape exemplified in them, and the method of certain contemporary artists in England and elsewhere as Clive Bell and Geoffrey Scott. These reacted against what they saw as the indiscriminate involvement of the visual arts in the nineteenth century with the non-visual arts and extraneous disciplines such as history and morality, by redefining their role as to make them more attentive to their own particular problems.

The artistic sensibility in which the landscape photograph appears is not easy to define but there is involved the need to strike a particular balance between revelation and concealment.

The selection of a landscape subject and its exposure on film can create a picture which is clear and direct, and yet at the same time reserved and private, because it represents the artist's mood and personality without bearing the visible mark of his hand—the selecting being "artistic" but the process of realization being mechanical and not manual.

Nash would have profited from the ready acceptance today of new media for the fine arts. Though he did exhibit his photographs alongside his pictures in a small number of exhibitions, he used them mainly as material from which to paint pictures.

The essential point of interest, however, is not that Nash was restricted by a more limited selection of art than he would have today, but to appreciate that his sensibility, his style and forms are mainly of historical interest.

The author is lecturer in the history of art at Manchester University.

## BLACKWELL'S and ECONOMICS

### Zero Growth?

ALFRED SAUVY

Translated by A. Maquire

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## BOOKS

### Looping the loop

**Electronic Circuits and Systems**  
by Robert King  
Nelson, £4.95  
ISBN 017 771021 7  
**Electrical Circuits and Systems**  
by N. Morris  
Macmillan, £3.95  
SBN 333 18519 6

The justification for yet another book aimed at the second and third year undergraduate level is a very careful ordering of material and meticulous attention to the depth in which various topics are tackled in relation to their overall importance. Robert King's book therefore becomes acceptable not only to the non-specialist electronics student but also to the second-year electronic circuit specialist.

The first seven chapters deal with the various components of electronic circuits from diodes to integrated circuits, relating observable terminal characteristics to the underlying physical behaviour and at the same time developing small and large signal models suitable for the analysis of circuits. FETs are well integrated into this treatment before bipolar transistors. Less commonly treated devices such as light sensitive devices and thyristors are also included.

The next six chapters deal with linear amplification. This involves gradually from a treatment of a single-stage amplifier through multi-stage amplifiers with feedback to the treatment of integrated operational amplifier connections as the present means of obtaining linear amplification.

The chapter on noise is ahead of any existing treatment of the subject in the space allowed, describing both theoretical foundation and practical application clearly and succinctly.

A well-thought-out chapter on feedback provides the foundation for its application to both operational amplifier use and a sub-

sequent short chapter on control systems. Particular emphasis is placed on practical ways of estimating the effects of feedback and ensuring stability by compensation. This is done using Bode plots mainly, and the treatment is oriented towards design rather than analysis.

The chapter on control restricts itself to the classical position and rate servo which may be difficult to follow by students not versed in electric-motor theory, but should nevertheless form a suitable foundation for the treatment of other systems.

The final three chapters deal with combinational and sequential logic and timing circuits. The chapter on combinational logic seems to fall short of the standard of the rest of the book. Diode gates are used as defining elements in the introductory sections, which necessarily omits the crucial requirement for gates to be cascaded and therefore to include inverters. Following from this, the choice of circuits to give well defined '0' and '1' states for wide variations in loading is not emphasized as much as 'noise-margin' performance, although this latter cannot be defined rigorously enough in a text of this level to be really useful. In particular the relatively stable '0' level provided by a bottomed transistor is never emphasized.

The FET-Gate section mixes a number of key concepts which account for this widespread adoption of the term logic and equally restricts its range of application. The reference for this section is dated by comparison with Penney and Loy's book, for example.

This book by Morris is a text on elementary circuit theory with a heavy bias towards power engineering rather than electronics. It is not to be justified for the word 'systems' in the title. The production is good, the book is very easy to read and clearly illustrated, and SI units are used throughout.

Topics covered include basic circuit theorems; magnetic circuits; electrostatics; alternating current; voltage, single and three-phase; and transformers. Complex notation and transients are dealt with separately in two extra chapters.

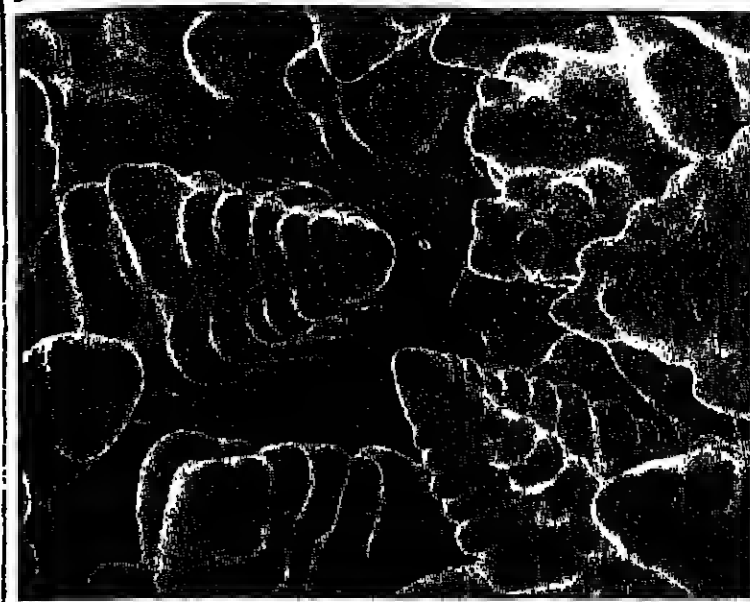
A large part of this book is taken up with worked examples which follow the appropriate section of text. In most cases however the 'solution' is obtained by plugging numbers into a formula just developed which seems a rather laborious way of giving the student an idea of the orders of magnitude involved.

These are hardly any 'loose' in the book; the treatment is strictly sequential so that, for instance, no components are drawn between the 'complex notation' way of solving a problem involving reactive elements, and the differential equation methods described under 'transients'. The relationship between the 'phasor' way of treating circuits and complex notation method is also derived over several examples without much guidance about when to use one or the other. The concept of duality is also mentioned though examples of Thovenin theorem solutions are followed by Norton theorem solutions and C-R circuit analysis follows L-R circuit analysis.

This treatment must leave the student with the feeling that he is dealing with a large number of clearly unrelated facts unless a tutor links up a lot of the material verbally. The text is aimed at potential technicians and may be suitable for a first-year engineering course text in electrical engineering; it is unlikely to appeal to anyone hoping to specialize in the electronics for which more suitable texts are available.

H. A. Kemhaddi

## BOOKS



The somewhat fernlike growths in the picture are called 'dendrites' and are actually crystals of a copper alloy growing into a cavity in a casting, photographed with a scanning electron microscope (SEM). From a chapter on the formation of cast structures from the liquid, as in the case of dendrites in Engineering Materials and Their Applications, by R. Elin and P. Trojan, published by Houghton Mifflin at £3.55.

### The hard stuff

**Reinforced and Prestressed Concrete**  
by P. K. Kong and R. H. Evans  
Nelson, £8.00 and £4.95  
ISBN 0 17 751040 9 and 771022 5

Following recommendations from a number of international bodies and advisory committees concerned with the design of concrete structures, a new British Standard Code of Practice, CP 110, was issued for comment in 1969. The aim was eventually to replace three existing codes, CP 114, 115 and 116. Not only were these codes inconsistent but also they were lacking in many areas. Clearly revisions and changes were inevitable if the results of recent research were to be included and the industry chose to embrace most aspects of structural concrete.

One document using a philosophy outlined by the European Concrete Committee (CEB) known as Limit State Design. Briefly, the design process should ensure the achievement of an acceptable probability that the structure does not become unfit for the use for which it is required during its specified life. A similar design process has been used in the Soviet Union for over twenty years.

Since the proposals and techniques were new to Britain, it was not surprising that the draft, which was unnecessarily complicated, resulted in many comments. Some reaction to the design procedure still remains after three years of use of the code which was issued in 1972 and is now incorporated in the building regulations. With such far-reaching changes, a number of books have appeared since 1970 dealing with limit state design. Some older publications have been revised and new volumes have appeared swelling the list to date.

Dr Kong, now lecturing at Cambridge, and Professor Evans, have produced a clear and concise text for students of civil and structural engineering. It is intended to explain basic theories and fundamental behaviour of concrete structures and to apply the philosophy of CP 110. The book covers all the material taught at engineering schools and universities. Chapter one is an introduction to limit state design, covering the appropriate statistical background and including useful probability data.

There follows a resume of concrete materials technology, describing properties of concrete, aggregates and admixtures, and hardened concrete. The design is only briefly mentioned. The book is a practical guide to the design of concrete structures, covering all the material covered in CP 110. The design is only briefly mentioned. The book is a practical guide to the design of concrete structures, covering all the material covered in CP 110.

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### Tree search

**Computational Structures**  
by F. A. V. Hill  
Macdonald and Jane's, £2.95  
ISBN 0 444 19522 X  
An Introduction to ALGOL  
by F. R. Wilson  
Bell, £2.50  
ISBN 0 7135 1877 4

Computational Structures is the latest in Macdonald and Jane's excellent series of computer monographs. Like other books in the series it provides an introduction to a well-defined area of computer science. The main topics covered are data structures, table searching and sorting.

Dr Hill distinguishes information structures such as graphs, trees and lattices and storage structures which are used for representing information structures within a computer. Some of the nomenclature is a little unfamiliar. For example, a 'linked list' is referred to as a 'linear tree'. The structures of algorithms are discussed briefly, and decision tables and the role of recursion are mentioned. Flow charts are used sparingly to describe algorithms. For the main part, however, an ALGOL-like language is used.

Diagrams are used effectively throughout the book particularly in describing storage structures. The pros and cons of sequential and linked storage are discussed and efficient methods of storing trees and networks are described. Storage methods and management techniques are described including a mention of garbage collection.

Table-searching methods described include binary search, tree search and hashing methods. Tree searching is shown to be quite inefficient in the worst case and the idea of a balanced tree is introduced. However, for algorithms describing balancing the reader is referred to the literature. Various hashing methods are described and the problems of primary and secondary clustering are discussed.

The author describes the main internal sorting methods and refers briefly to external sorting. He discusses the efficiency of the various methods in terms of space, time and programming effort, and prefers bubble insertion sort, for ease of programming, radix sort for large N and treasort where space is at a premium.

Each chapter has exercises at the end of it; some of them are quite ambitious, such as 'Write a complete string-processing system' or 'Program a macro preprocessor'. In less than 200 pages it would be impossible to go into the depth of, say, Knuth's mammoth Art of Computer Programming series; however, the treatment is relatively thorough and would seem suitable for a second-year university or polytechnic course rather than for beginners.

An Introduction to ALGOL is intended as an introduction to ALGOL 60 for sixth-formers and students in colleges of education. Since 1960 many books have been written on ALGOL, though I do not know of any other aimed at this particular readership. The treatment is very elementary. The four chapters are entitled 'Algorithms', 'ALGOL', 'Further ALGOL' and 'Scoring', the chapter on further ALGOL dealing with such topics as jumps, loops and the use of the basic word flow. Procedures are not mentioned in the main text at all but are referred to in an appendix.

Extensive use is made of flow charts in the text. The view that programming style is reinforced by the abundant use of labels (not encouraged these days) in sample programs.

The author points out that his treatment of the language is not particularly rigorous and justifies some half-mystical by working them with an oblique and referring to a page where the point is explained in more detail.

Each chapter has a large number of examples associated with it, some of which border on the trivial. It may be that this book fills a need for a particular class of readership; but it might also be felt that there are already sufficient elementary books on ALGOL 60 around.

John Ash R. B. Hunter

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### Meeting their needs

**Complex Variables for Scientists and Engineers**  
by John D. Poloures  
Collins-Macmillan, £8.70  
ISBN 0 02 390550 6

The phrase 'for Scientists and Engineers' in a book title provokes two questions. What does this imply about the selection and presentation of mathematical material, and are the requirements of the scientists and engineers being met?

The treatment is satisfactorily rigorous, the text is entirely readable and the layout is good. Examples (worked and otherwise) are distributed in digestible numbers at intelligent intervals, and are interesting and illuminating. The organization of material for the intended readers is seen principally in the order of presentation (for example, by means of temporary deferment of proofs), and in shades of emphasis.

In the preface, Professor Poloures makes it quite clear that his objectives are to provide a sound understanding of the subject through a 'first course' which will lead to the 'frontier' of the promised land of applications of complex variables or to a second course in the theory of analytic functions. This premisses a criticism that the needs of the scientists and engineers are not met, since an exploration of the 'promised land' is specifically excluded from the objectives. There remains, however, a feeling of frustration arising from the inclusion of a short concluding section on topics for further study which certainly both applications of the subject as developed previously and additional theoretical topics. Depending on what one regards as a 'first course', this should perhaps be regarded as a bonus, but it nevertheless causes an impression of imbalance.

The first part is concerned with algebraic and geometric introductory aspects, analytic functions, and

transformations. This more than covers the usual content of a first-year syllabus taken by undergraduates in science and engineering. In the second part 'The Foundations of Complex Function Theory', of roughly the same length, a most satisfactory treatment of line integrals precedes attention to the integration of analytic functions. Cauchy's theorem, Cauchy's integral formulae and Morera's theorem are dealt with, and this section concludes with chapters on series and residues.

At this point one might take the view either that the development of the subject has exceeded 'first course' expectations, or that one is next going to encounter a fairly comprehensive discussion of at least further mathematical utilization of the preceding topics, and possibly a spectrum of scientific and engineering applications also. Here is the dilemma. Poloures has already successfully met his stated objectives, but in a forty-page part three, half of which is concerned with further theory, one encounters for the first time the application of the residue theorem to the evaluation of real integrals, and the application of complex variable methods (chiefly through examples of mappings) to physical systems (such as fluid flows).

Obviously it is necessary to restrict attention to both of these areas to a relatively small number of typical problems, and to select relatively simple examples. It is probable that a student who has reached the level of competence and understanding expected at the end of part two will be proceeding without a break. In the same mathematical course, to a considerably more comprehensive examination of extended applications. No doubt what is offered is intended mainly to whet the appetite. It is debatable whether the 'non-engineering' course should extend into the applications in other subject-areas, but there is legitimately room for much more in the present case. A second book is needed.

J. M. Firth



## BOOKS

## Technology transfer

Proceedings of the 15th Machine Tool Design and Research Conference  
edited by S. A. Tobias and P. Koenigsberger  
Macmillan, £59.00  
SIIN 333 15057 0

This volume contains 85 papers, plus the opening address, given at the 1974 Machine Tool and Design Research conference at Birmingham University. The past session discussions do not appear to have been included, though the flysheet claims these are in the contents. The range of topics is very large, covering group technology; computer numerical control; computer aided design; machine tool elements; metal cutting; machine tool dynamics; noise; grinding; electro-discharge machining; hot forming; the life; drilling; drawing; cold forming; construction and general forming. As the standard of presentation of figures and photographs is very high and the research described must have cost millions of pounds, the price of £59.00 would at first appear to be good value for money. However, the variety of topics is the major criticism of the volume. The papers all have some connexion with manufacturing using metal, but the specific papers are so diverse and often specialized that very few manufacturing companies, research establishments or even universities and polytechnics would find even 50 per cent of the papers relevant or applicable to their interests.

For example, I have been involved in machine tool research for ten years and yet only 30 of the papers are minutely within my area of interest and no detailed examination of this number reduces to 15. The argument could well be raised that

I am too much of a specialist and that the papers are more useful to industry, where the whole range of topics is useful. This appears to be the publishers' view, who state on the cover "The contributors come from industry, universities and centres of research". The range of industry first is significant, particularly as under 10 per cent of the papers were presented by industry. Universities and polytechnics provided 80 per cent and the remainder came from research establishments. The publishers and the organizers clearly hope that the volume will be useful by communicating research results to industry and this was the main theme of the opening address by J. W. Atwell: "As I thought about all this work going on in universities and research centres in many countries, I was reminded yet again of the problem of communicating these ideas and now developments to engineers in manufacturing industry who should be making use of the information and I wondered what plans were being made to improve the communication of this knowledge—what has come to be known as 'technology transfer'."

The problem is that to understand the research papers a specialist is frequently required but then the specialist has a general knowledge of the whole manufacturing industry. However, the man with the general knowledge is not specialized enough to understand the papers. The volume is thus rather expensive and too broad for the specialist and too narrow for the generalist. However, in my opinion, some intermediaries are required, such as the research associations who will be able to employ sufficient specialists to understand the research and who will then act as filters and communicators to industry.

B. J. Stone

## Working with limitations

Engineering Design  
by John Stephenson and R. A. Calender  
Wiley, £13.65  
ISBN 0 471 82210 8

There is no other topic in engineering education circles that causes more controversy than engineering design; this may seem strange since most are agreed that design is the essence of engineering. The arguments usually stem from those who believe that you have to master science before you can apply it; leave it to industry they say. The real challenge in engineering education is to seek a balance between the extremes of untutored intuition (leaving it to industry) and of academic sterility (leaving it to the universities) and many would argue that this can be provided through the activity of engineering design. Continental practice has usually been through the machine element approach by getting students to size different components, according to strength criteria, such as gear wheels, shafts, springs, couplings and so on. In some British and North American universities an integrated approach has been tried which involves not only strength aspects but also performance and manufacturing requirements linked with management and financial considerations.

This book seems to aim at a mixture of both; the primary concern is definitely towards the component design approach with a few short chapters on electronics, communications, materials and structures. It is a great pity that in a seven-volume series on topics such as this the dilemma of compromise that the designer undergoes has not come across. It is what design is about—making decisions about materials, subject to their availability and cost; getting the parts or system will perform reliably to within certain prescribed limits and that the manufacturing skills and machines are available to produce them; or re-examine the design. The authors seem to advocate that the component design approach is already dealt with in the other books which are not referred to. Even the fundamentals of stress analysis—what is about—

not rigorously expounded through the elementary but vital notions of equilibrium, compatibility and stress-strain requirements; for, if they had, a proper awareness of the importance of plastic design methods would have been more evident.

The book is divided into three main parts. The first and last of these are of general interest regardless of engineering discipline while the middle one deals with the strength and design calculations practised usually by mechanical and civil engineers. There are 15 short appendices containing various formulae and other data together with graphs of elastic stress concentrations, factors and tables on bearings for the reader to refer to. It is a hard stuff which is readily available in handbooks. The text is nicely produced with clear print and good diagrams; the work sheets give a flavour of "real" design calculation. A random check (example 9.3) revealed a definition of one of Newton's laws, which is plain and photographs are uninspiring and often indistinct. Each chapter is appended by lists of references and collections of problems; there are no guideline answers to the problems.

Important features of design activity are missing. These include how sketches, often the starting point in design, then link a single sketch in the whole book—breaking large problems into smaller manageable ones that are amenable to analysis, doing some small sums before refinement, by more sophisticated methods, elementary calculation and numerical analysis, optimization and reliability. These are all difficult topics to write about, often subjects in their own right along to discuss, but in a book like this they should have appeared in one form or another. It could well be that the book has been written around the special needs of civil structures in Australasia; perhaps, by virtue of the degree course there lasting four years, most of the topics are available for the specialist though it is made to work. On the whole the book is unlikely to be suitable for British undergraduates.

R. K. Penny

## Science and computers

Laboratory On-line Computing  
by J. E. Brignell and G. M. Rhodes  
International Publishing, £8.75  
ISBN 0 7002 0258 7

Few technological innovations can compete with the explosive growth of computer applications in experimental science. One aspect of this growth has been the use of a computer in direct association with scientific instrumentation, either as a means of collecting and analysing data, or as part of a control loop. The authors have chosen this aspect of computing as the subject of an interesting textbook. The subject is a broad one and any text would necessarily be selective. Recognizing this Brignell and Rhodes have adopted an approach which shows how to arrive at optimum solutions to specific problems. This approach necessarily makes considerable demands on the reader who is assumed to have a sound knowledge of electronics, mathematics and of "ordinary" mathematical computing. Therefore, it must be assumed that the intended readership will be mainly at the postgraduate level and it is unlikely to be used as a textbook on undergraduate courses. This is disappointing, since many postgraduate courses in chemistry and related subjects now place considerable emphasis on the applications of computers in instrumentation.

The book is in two parts; the first deals with aspects of software, hardware and mathematical techniques, as they effect on-line computing; the second part emphasizes the conversion of scientific instruments into computer

peripherals. In the first part we find a useful justification for finding a computer usage, followed by an excellent treatment of hardware, software and the interaction between the two. Although much of the content of these early chapters will be familiar to the intended readership, it serves as a useful introduction to the use of computers in scientific instrumentation. Many interesting points emerge from the peripheral chapters. The opening remark of Lister's book, that the operating system is probably the most important part of the software in a computer, may reflect the current attitude that control and management is more important than production, but it also reflects the fact that since we have to live with it we had better understand it.

Based on lectures to students in their first undergraduate year, the work will be difficult, but not impossible reading for those without the presumed background. There are one or two conventional flow diagrams and one or two routines written in algorithmic language. There are a lot of diagrams of data

Graham Beech

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## BOOKS

## Mysterious no more

Fundamentals of Operating Systems  
by J. M. Lister  
Macmillan, £7.95 and £2.95  
ISBN 333 16867 4 and 18443 2

The number of people who regard computers as an inscrutable mystery is rapidly decreasing, but there are many regular users of computers who continue to take this attitude about what is known as "system software". In part, this is due to the attitude of manufacturers, who insist that it must remain a mystery, and who discourage would-be users by continually changing it and decrying today what they were extolling yesterday. Although some of this is just commercial dishonesty, some of it, like some of the uses of the Official Secrets Act, is due to a genuine need for security. The opening remark of Lister's book, that the operating system is probably the most important part of the software in a computer, may reflect the current attitude that control and management is more important than production, but it also reflects the fact that since we have to live with it we had better understand it.

Based on lectures to students in their first undergraduate year, the work will be difficult, but not impossible reading for those without the presumed background. There are one or two conventional flow diagrams and one or two routines written in algorithmic language. There are a lot of diagrams of data

Bryan Higman

## Designs on digital data

Analysis and Design of Digital Systems  
by Neil Uznadze with James C. Morakis  
Gordon and Breach, £16.70  
ISBN 0 677 04100 4

The first objection to this book is its misleading title. It is not about the analysis and design of digital systems, but is more concerned with particular aspects of digital data transmission system design.

The eight chapters deal with Pulse Code Modulation (PCM), including the need for analog-to-digital conversion and conversion into a digital code; the design and use of multiplexers; shift register systems for generating codes for data encoding; design of matched filters, equalizers and digital filters; modulation and demodulation techniques; and phase-locked-loop and bit synchronization techniques.

The three appendices deal with definitions and useful functions in digital communication theory, digital conversion techniques and comparisons and field-effect devices.

The book is supposedly written for design engineers, scientists and students, but I can see no future for it as a student textbook. The author has made the classic mistake of assuming that his audience is as

knowledgeable as he is, and launches into the subject matter on this basis. In chapter one he discusses the advantages of a PCM system before explaining what a PCM system is and what the initials stand for.

There are many errors of fact and unclear statements. For example, the excess-3 BCD cyclic code is described as a 23-bit cyclic code, but not an excess-3 code; the data sequence generated by the 4-stage chain code generator is incorrect; the terms Esaki diode and digital matcher are used whereas the accepted terms are tunnel diode and coincidence gate; the autocorrelation function definition (page 444) contains the statement "F is its Fourier transform". It is not clear what "its" is in this sentence.

Besides the poor quality of the technical material, the book also contains an abundance of typographical and grammatical errors. I seriously suggest that the book be withdrawn and corrected and that the author thinks very hard about exactly what he wants the book to be: an aid to design engineers or a textbook for students. At the moment it is none of these and I can find no feature to recommend it.

R. G. Bennetts

## Electronic background

A First Course in Applied Electronics  
by R. G. Bennetts  
Macmillan, £5.95  
ISBN 333 17174 8

In the preface Professor Gosling states that this book is "a very thorough introduction to the subject of electronics". The text is written in a straightforward, unpretentious style, without doubt, an introduction to the subject of electronics.

However the revisions have been so numerous that the book is now a patchwork of old and new material. It is suitable as a background reading for first-year students on an electronic degree course; although the continued absence of references for chapters two to eight is surprising and I wonder how the student will check the accuracy of the material. The book is divided into 12 chapters, with the first two chapters describing the physics and fabrication of semiconductor devices constitute required reading when no guidance or references are given.

D. A. Gregory

## After Newton

Applied Electromagnetics  
by J. F. Fienberg and S. J. T. Owen  
Macmillan, £8.95 and £4.95  
ISBN 333 17993 5 and 15205 0

It is said that the great Sir Isaac Newton was once asked how he came to discover the law of gravitation. His answer was "by thinking about it all the time". It is a splendid answer and one worth pondering, but it is also an answer likely to unnerve with students and much to those educationalists who purvey instant and painless enlightenment.

Professor Parton and Dr Owen have written a book on electromagnetics, a subject which has many links with gravitational theory. It is likely that Sir Isaac's dilemma means much to them. Clearly they have been thinking about their subject, if not all the time, then at least over a period of many years. The book bears the marks of long experience in teaching. They know how to introduce a topic, how to elucidate it and when to leave it.

It is indeed a difficult subject. Not that the mathematical structure is difficult, although some of it may be unfamiliar. In this connexion the opening chapter on vector analysis is valuable, but the difficulty is chiefly one of clothing the symbols with experimental situations. Maxwell's equations are insignificant to mathematicians. To physicists they are Victorian, and definitely pre-enlightenment. But to electrical engineers they are the code which has to be broken to understand how things work: things like transformers and waveguides, microwaves, digital computers. Most electrical engineering courses yield at once to the clamour for hardware, for relevance, for usefulness. Their students become specialists and they know many things, but they do not know this one central thing.

Students at Nottingham are more fortunate. It seems. This book takes them through electrostatics, magnetism and electromagnetic waves. At every stage there are examples of actual physical situations accompanied often by clear diagrams. There are also lots of examples to be worked by the reader, a very important aid to understanding. Anyone who works through the book will be forced to think and to think again.

Is there nothing to criticize in the book?—very little it seems. Should have liked more of the dual formulation of poles and charges. The authors know the history of their subject and their silence on magnetic poles is strange. Can it be a surrender to the popular demand for realism in science which confuses ideas with pieces of hardware? But when there is so much for which to be grateful, like the discussion of Faraday's law for instance, it is childish to be critical. An introduction to this subject has necessarily to be selective and the authors have made a very careful selection. It is a book which can be warmly recommended.

Percy Hammond

## Reviewers

John Ash lectures on concrete materials and structures at the University of Birmingham; J. F. Fienberg is a senior lecturer in chemistry and co-author of Inorganic Thermodynamics; he is senior lecturer at Wolverhampton Polytechnic.

Francis Cheers has written Elements of Gas Dynamics and is senior lecturer in engineering at the University of Manchester.

Mary Ellison lectures in American history at the University of Keele and is senior lecturer in Science and Technology at the University of Keele.

B. A. Gregory has written An Introduction to Electrical Engineering and is a lecturer at Belghem Polytechnic.

A. Rupert Hall is professor of the history of science and technology at Imperial College, London; he is author of The Scientific Revolution, from Galileo to Newton.

Bryan Higman is professor of computer studies at the University of Lancaster and is working on a book on structures and assemblies in natural and artificial languages.

## Oxford Engineering Science Series

## The Thermodynamics of Fluid Systems

L. C. Woods

An account of equilibrium thermodynamics and of irreversible thermodynamic processes is given in this book, suitable for postgraduate students in mathematics and the physical sciences. The emphasis is placed throughout on the role of time-scales in determining the nature and extent of state space, an approach that makes clear the unity of classical, kinetic, statistical, and process thermodynamics. £15 30 November

## Wave Motion in Elastic Solids

Karl F. Graff

This is a comprehensive text at graduate level on elastic wave propagation in solids. It progresses from the elementary theory of waves and vibrations in strings, longitudinal and flexural waves in thin rods, and waves in membranes, thin plates, and shells, to a full treatment of waves in infinite media, waves in a half-space, scattering and diffraction, and waves in thick rods, plates, and shells. £15

## Metal Fatigue

N. E. Frost, K. J. Marsh, and L. P. Pook

All facets of the fatigue of materials, components, and structures are dealt with in this definitive book. The aspects covered include crack initiation, the fatigue strength of plain specimens, the effects of stress concentration and cracks on fatigue strength, and the growth of fatigue cracks. £14

## Synthesis of Planar Antenna Sources

Donald R. Rhodes

This book is the first in a central problem in antenna theory, that of source synthesis. It is a systematic presentation of the original results obtained by the author in the course of a decade of research. The emphasis throughout is on the theoretical foundations of optimum source synthesis, including conditions for physical realizability and mathematical methods for satisfying them. £8.50

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## PRINCIPAL LECTURER IN CONSTRUCTION

The School of Civil Engineering has a vacancy for a Principal Lecturer to act as subject leader in Construction. The successful candidate will be a graduate chartered civil engineer with experience in teaching and research/consultancy and who will be expected to supervise teaching and laboratory work in the fields of Construction Technology, Construction Management and Materials Technology up to final honours degree level, generally making a major contribution to the work of the School. Salary £5,940-£6,642 (b) £7,578 plus London allowance £267.

### LECTURER II/SENIOR LECTURER IN BUILDING CONSTRUCTION AND SERVICES

The School of Surveying has a vacancy for a suitably qualified and experienced enthusiast to teach Construction Technology and Service Installations, to degree level, surveying students. Previous teaching experience desirable but not essential. Research and post-graduate work encouraged. Salary within range £3,279-£5,417 plus London allowance £267.

Further details and application forms from: Appointment Officer, Kingston Polytechnic, Poplar Road, Kingston upon Thames, KT1 3AA. Tel: 01-848 1333. (Closing date: December 7.)

## PAISLEY COLLEGE DEPARTMENT OF BIOLOGY

### Lecturer/Senior Lecturer

Applicants should have a good Honours degree with either a Second Class or First Class Honours, and be able to teach at Honours level. Preference given to candidates with specialist knowledge of the association of micro-organisms with animal hosts, and with experience in teaching bacterial physiology.

Salary scale: Senior Lecturer £4,000 to £7,716; Lecturer £3,216 to £5,455.

Application forms and further particulars from: Establishment Officer, Paisley College of Technology, 100, Glasgow Road, Paisley, Renfrewshire PA 1 2BE (tel: 041-847 1041), quoting ref. 1187/1/15. Closing date 28th November 1975.

## Lectureships

Anglian Regional Management Centre  
Department of Manpower Studies  
Principal Lecturer in Personnel Management, Industrial Relations and Training is required to develop existing and new courses with particular reference to the application of the social and behavioural sciences in organisations; to undertake the role of Course Group Supervisor, and to be Course Supervisor for the Diploma in the Management of Human Resources. Appropriate industrial, teaching and/or research experience is essential. (Ref. S/AO.282A)

Faculty of Environmental Studies  
Department of Civil Engineering  
Lecturer II/Senior Lecturer is required. Candidates should possess a degree in Civil Engineering and have some industrial and/or research experience. (Ref. S/AO.282B)

Faculty of Engineering  
Department of Mechanical Engineering  
Research Assistant is required to contribute to the design, development and construction of a water treating engine. Candidates should have some academic engineering education, at least to H.N.C. standard. (Ref. S/AO.282C)

Salary scales: Principal Lecturer £5,840-£7,578  
Senior Lecturer £5,031-£5,955  
Lecturer II £3,279-£5,493  
Research Assistant £1,032-£2,175  
(Plus appropriate London Allowance.)

Further details and application forms from: Assistant Director (2), North East London Polytechnic, Forest Road, London, E17 4JB. Tel: 01-627 2272. Ext. 167. Closing date: October 31, 1975.

## NELP North East London Polytechnic

### HEAD OF DEPARTMENT OF ACCOUNTANCY AND ECONOMICS

Resulting from the recent creation of an additional department, applications are invited for this newly established post. The immediate objective of the department will be to introduce a new degree course in Accounting. Applicants must have high academic qualifications in an appropriate discipline (e.g., accounting, economics or law), experience in teaching at degree level, and relevant practical and/or research experience, together with a proven record of administrative ability.

## SENIOR LECTURESHIP IN ACCOUNTING

Applicants should have a good Honours Degree in a relevant discipline, experience in teaching at degree level, and appropriate practical and/or research experience. The successful candidate will be expected to make a substantial contribution to the development of the new degree course in Accounting.

Solaries: Head of Department, £6,013 per annum, with initial floating dependent on approved prior experience.

Financial assistance towards the cost of removal expenses may be payable.

Further particulars and application forms obtainable from The Principal, Dundee College of Technology, 501 Great Galloway Road, Dundee, to whom completed application forms should be returned on or later than 28th November, 1975.

## dundee college of technology

## Fellowships and Studentships

CAMBRIDGE  
LUCY CAVENDISH COLLEGE  
(Lucy Cavendish College is a constituent college of the University of Cambridge.)

CAIRO  
CALOUSTE GULBENKIAN  
RESEARCH FELLOWSHIP  
and  
POSTGRADUATE  
STUDENTSHIP

are offered. These are primarily designed for women whose careers have been interrupted by marriage or other reasons and who wish to resume their professional work. Candidates for Fellowship must have evidence of original work.

Further particulars, which may be obtained from: Lucy Cavendish College, Cambridge, CB2 3RQ. Tel: 0223 333333. Closing date: 7 January, 1976.

LANCASTER  
THE UNIVERSITY

Applicants are invited for a TEMPORARILY FELLOWSHIP in the Department of Biology, to start on 1st January 1976. The post is for one year, with the possibility of extension to a second year. The successful candidate will be expected to contribute to the teaching and research work of the Department, and to take part in the development of the Department's research programme.

Further particulars may be obtained from: The Department of Biology, Lancaster University, Bailrigg, Lancaster, LA1 4YW. Tel: 0546 374444. Closing date: 15th November 1975.

Further particulars may be obtained from: The Department of Biology, Lancaster University, Bailrigg, Lancaster, LA1 4YW. Tel: 0546 374444. Closing date: 15th November 1975.

## City of London Polytechnic

Department of Mathematics and Statistics, St. John's School of Science and Technology, Head of Department: A. Spain, M.A., M.Sc., Ph.D., F.I.M.A.

## Research Fellowship

Applications are invited for a Research Fellowship in Computer Science for two years. Applicants should hold a Ph.D. or similar research qualification, or should have at least three years of research experience in industry or commerce. Preference will be given to applicants with experience in one of the following fields:

- (i) Discrete event Simulation;
- (ii) Computer Languages;
- (iii) Modelling of Physical Processes;
- (iv) Computer applications in numerical analysis.

Solaries on scale £2,973 to £128 (2) £3,225 to £144 £3,225 plus London Allowance of £361, according to experience and qualifications.

Application form (which should be returned by 28 November 1975) and further details obtainable upon request from the Assistant Secretary, City of London Polytechnic, Administrative Headquarters, 117-119 Houndsditch, London EC3A 7AU.

## Somerville College Oxford

Somerville College, Oxford, invites applications by 10 January 1976 for a Mary Ewart Research Fellowship, tenable for two years from October 1976. Annual value £1,200 and free residence in College. Applicants should be women graduates at least in their second year of research, but not of post-doctoral standing. Selected candidates will be invited to attend for interview at their own expense. Application forms are obtainable from the Secretary, Mary Ewart Trustees. Please enclose stamped addressed envelope.

## Colleges of Education

## ST. MARY'S COLLEGE,

Strawberry Hill, Twickenham

### Lectureship in History

Graduate required to commence in May, 1976, or earlier if possible, in the Roman Catholic College of Education. The person appointed will specialise in British and European history in the nineteenth century but will be expected to teach in the field of general history. It will also be necessary as the department is now engaged in introducing courses for the new B.Sc. in History and European Studies. An ability to teach in a secondary school setting is an essential qualification for the post and applications from candidates with good teaching experience in a secondary school will be particularly welcome.

Full particulars of the post are available from the Principal, The Very Reverend T. P. Cusack, C.S.C., St. Mary's College of Education, Strawberry Hill, Twickenham, Middlesex, to whom all applications should be addressed accompanied by copies of two recent photographs and the names of two referees.

The salary will be in accordance with Payscale plus London Allowance.

Closing date for receipt of applications will be 30 November, 1975.

## EAST SUSSEX

## EDUCATION COMMITTEE

## ERINGTON COLLEGE OF

## TECHNOLOGY

## Principal: S. C. Roman, M.A.

## B.Sc. and Ph.D. degrees in

## Physics and Modern History

## (Awarded by the University of

## Sussex) are available for

## Further particulars and

## application forms may be

## obtained from: The

## Principal, Erington College of

## Technology, Erington, East

## Sussex, BN1 1JL.

## Closing date: 15th

## November 1975.

## Typing and

## Duplicating

## Salary scale: £3,216 to

## £7,716 per annum

## plus London Allowance

## Application forms and

## further particulars from:

## The Principal, Erington

## Colleges and Institutes of Technology continued

### KENT COUNCIL EDUCATION COMMITTEE CANTERBURY COLLEGE OF TECHNOLOGY

Applications are invited for the following academic appointments:

## DEPARTMENT OF BUSINESS

## AND GENERAL STUDIES

## PRINCIPAL LECTURER IN

## BUSINESS STUDIES

Applications are invited for the post of Principal Lecturer in Business Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Business and General Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF CATERING

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## CATERING STUDIES

Applications are invited for the post of Principal Lecturer in Catering Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Catering and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF COMMUNITY

## STUDIES

## PRINCIPAL LECTURER IN

## COMMUNITY STUDIES

Applications are invited for the post of Principal Lecturer in Community Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF DESIGN

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## DESIGN STUDIES

Applications are invited for the post of Principal Lecturer in Design Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Design and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF EDUCATION

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## EDUCATION STUDIES

Applications are invited for the post of Principal Lecturer in Education Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Education and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF ENGINEERING

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## ENGINEERING STUDIES

Applications are invited for the post of Principal Lecturer in Engineering Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Engineering and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF HEALTH

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## HEALTH STUDIES

Applications are invited for the post of Principal Lecturer in Health Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Health and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF HISTORY

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## HISTORY STUDIES

Applications are invited for the post of Principal Lecturer in History Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of History and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF LAW

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## LAW STUDIES

Applications are invited for the post of Principal Lecturer in Law Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Law and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF MATHEMATICS

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## MATHEMATICS STUDIES

Applications are invited for the post of Principal Lecturer in Mathematics Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Mathematics and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF MEDICAL

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## MEDICAL STUDIES

Applications are invited for the post of Principal Lecturer in Medical Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Medical and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF MUSIC

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## MUSIC STUDIES

Applications are invited for the post of Principal Lecturer in Music Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Music and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF NURSING

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## NURSING STUDIES

Applications are invited for the post of Principal Lecturer in Nursing Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Nursing and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF PHYSICS

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## PHYSICS STUDIES

Applications are invited for the post of Principal Lecturer in Physics Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Physics and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF PSYCHOLOGY

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## PSYCHOLOGY STUDIES

Applications are invited for the post of Principal Lecturer in Psychology Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Psychology and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF SCIENCE

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## SCIENCE STUDIES

Applications are invited for the post of Principal Lecturer in Science Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Science and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## DEPARTMENT OF SOCIAL

## AND COMMUNITY STUDIES

## PRINCIPAL LECTURER IN

## SOCIAL STUDIES

Applications are invited for the post of Principal Lecturer in Social Studies. The successful candidate will be responsible for the teaching and supervision of students in the Department of Social and Community Studies. The post is full-time and involves a significant amount of administrative work. The salary scale is £3,216 to £7,716 plus London Allowance. Further particulars and application forms may be obtained from: The Principal, Canterbury College of Technology, Canterbury, Kent, CT1 3JL. Tel: 01-246 1111. Closing date: 15th November 1975.

## Librarians

## Thames Polytechnic

## Librarian

Salary: £3,650-£7,222

including London weighting.

Applications are invited for the

post of Librarian responsible for

the library of the Woolwich and

Hammerhead sites of the Poly-

technic and for their development.

The library has a staff of 22

and over 60,000 volumes.

Thames Polytechnic comprises

Faculties of Science and Math-

ematics, Engineering and of Social

Sciences and Humanities at

Woolwich, SE18, and a Faculty